The avifauna of Kazimzumbwe Forest Reserve, Tanzania: initial findings

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The remaining coastal forests of Tanzania are the subject of an ornithological research programme by the International Council for Bird Preservation (now renamed BirdLife International). This programme aims to describe the bird assemblage in each of the remnant forests and evaluate their individual and relative conservation significance (e.g. Bagger *et al.* 1989, Burgess *et al.* 1991, Faldborg *et al.* 1991, Holsten *et al.* 1991). Recent work at Kazimzumbwe is a continuation of this ICBP (BirdLife International) programme.

Kazimzumbwe Forest Reserve (6° 58S, 39° 03E), which covers a total of 35 km^2, is located on the Pugu Hills about 25 km south-southwest of Dar es Salaam (Fig. 1). It was once contiguous with Pugu Forest Reserve to the north, but is now separated by a narrow strip of cleared land no more than 1 km wide at some points. Kazimzumbwe has received much less attention than Pugu from biologists, despite the close proximity of the two forests. This paper presents results of a first survey made in Kazimzumbwe Forest. As well as documenting the avifauna, we assess the importance of Kazimzumbwe for the conservation of coastal forest birds.

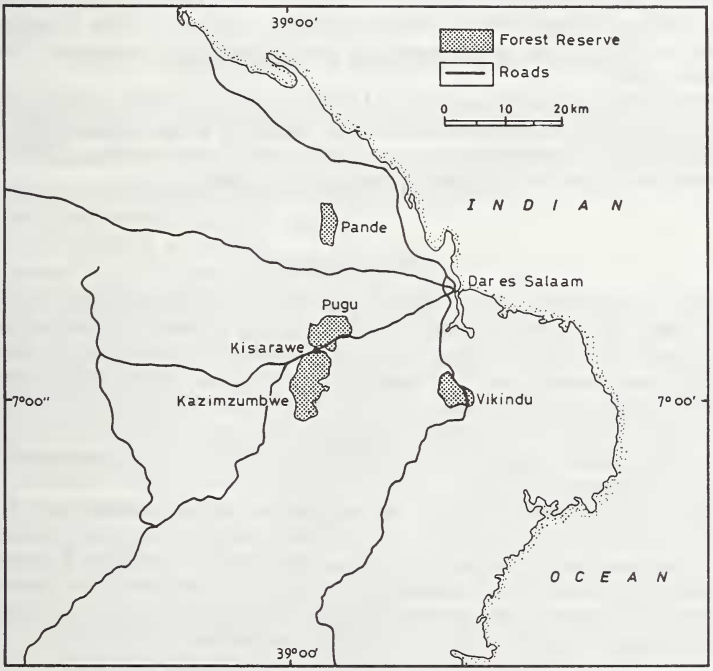

Figure 1. *Kazimzumbwe Forest Reserve and the neighbouring area*

Climate and vegetation

The climate at Kazimzumbwe is typical of the coastal strip, which has been described in detail for Dar es Salaam by Bargman (1970). There are two rainy seasons, the October–December "short rains" and the "long rains" in March–May. The mean annual rainfall of Kazimzumbwe is about 1210 mm (data from Kisarawe meteorological station) which compares closely with the 1260 mm in Pugu forest (Howell 1981).

The natural forest vegetation at Kazimzumbwe currently covers around 22 km^2. Most of this is in the northern half of the reserve where areas of primary forest, which appear less disturbed than similar areas in Pugu, still exist. The remaining part of the reserve was extensively logged in the past, and much of the southern zone was replanted with exotic trees (*Cassia* and *Eucalyptus* spp.) between 1961 and 1964 (Mwasumbi, pers. comm.). The natural vegetation remains undescribed.

Sampling of vegetation composition in the netting site identified *Albizia gummifera* (Gmel.) C.A. Sm. (Mimosaceae), *Bosqueia phoberos* Baill. (Moraceae) and *Baphia kirkii* Bak. (Papilionaceae) as dominant canopy species, and *Bequaertiodendron magalismontanum* (Sond.) Heine (Sapotaceae), *Manilkara sulcata* (Engl.) Dubard (Sapotaceae) and *Drypetes arguta* (Muell. Arg.) Hutch. (Euphorbiaceae) dominating the subcanopy layer. Other tree species included *Diospyros verrucosa* Hiern (Ebenaceae), *Bridelia micrantha* (Hochst.) Bail (Euphorbiaceae), *Pachystela brevipes* (Bak.) Engl. (Sapotaceae) and *Polysphaeria parvifolia* Hiern (Rubiaceae). *Olyra latifolia* L. (Gramineae) and *Achyranthes aspera* L. (Amaranthaceae) were common undergrowth species, whereas lianes/climbers included *Milletia puguensis* Gillet (Papilionaceae), *Landolphia kirkii* Dyer (Apocynaceae) and *Fragellaria guineensis* Schumach. (Flagellariaceae).

There is evidence of continuing illegal felling of trees for building poles and charcoal burning, both on the forest margin and within the forest. Local people also set traps to catch bush pigs *Potamochoerus porcus* and small forest antelopes such as suni *Nesotragus moschatus* and duikers *Cephalophus* sp. (pers. obs.).

Study Methods

The study was conducted from 10–25 August and 16–22 September 1990. A bird ringing camp was established about 2 km inside the reserve at a border between a *Cassia* plantation and natural forest vegetation. Netting for ground-dwelling and shrub-layer birds was carried out in a stand of typical forest which had the following vegetation structure: canopy height 14.9 + 3.3 m (n = 23, range 9.0–21.5 m), shrub height 7.6 + 1.5 m (n = 22, range 5.0–10.5 m), canopy cover 39.1 ± 35.2% (n = 28, range 0–100%), shrub density 37.2 ± 32.2% (range 0–95%), and ground cover 30.8 ± 27.0% (n = 28, range 0–75%).

A total of 18 360 metre-net hours was devoted to catching specimens in an area of around 10 ha. Four net-runs, each 1 m wide, were cut through typical forest. Eight or nine 3-m high nets were contiguously positioned. Nets were operated for not more than three days in any run, and were checked every half hour from 07:00 to 19:00 hrs local time. Standard biometric data were collected on the captures which were ringed with aluminium rings of the East Africa Natural History Society, and released.

Early morning and evening surveys and observations made during the day augmented the species list from mist-net sampling. However, visits to the forest in the August and September dry period coincided with the non-breeding seasons for most forest birds. It is therefore possible that some resident species which are difficult to catch have been overlooked bacause they were not singing.

Results

Forest avifauna

Table 1 shows the 58 forest birds recorded in the reserve. Species have been assigned to three categories of "adaptability" according to their vulnerability to habitat change, following the classification by Stuart (1983), with some additions:

1. Those which live in forest but are not dependent upon it for their continued survival (24 species).
2. Those which live in forest and can be found in other habitats, but are dependent upon forest for their survival (21 species).
3. Forest specialists (13 species).

Names of species follow Britton (1980).

Table 1. *Forest avifauna of Kazimzumbwe Forest Reserve*

Species	Adaptability[1]
Southern Banded Snake-eagle *Circaetus fasciolatus*	2
Little Sparrowhawk *Accipiter minullus*	1
African Goshawk *A. tachiro*	2
Crowned Eagle *Stephanoeatus coronatus*	2
Kenya Crested Guineafowl *Guttera pucherani*	2
Tambourine Dove *Turtur tympanistria*	1
Green Pigeon *Treron australis*	1
Livingstone Turaco *Tauraco livingstonii*	2
Yellowbill *Ceuthmochares aereus*	2
African Wood Owl *Ciccaba woodfordii*	2
Pearl-spotted Owlet *Glaucidium perlatum*	1
Fiery-necked Nightjar *Caprimulgus pectoralis*	1
Böhm's Spinetail *Neafrapus boehmi*	1
Narina's Trogon *Apaloderma narina*	3
Pygmy Kingfisher *Ispidina picta*	1
Green Wood Hoopoe *Phoeniculus purpureus*	1
Trumpeter Hornbill *Bycanistes bucinator*	2
Crowned Hornbill *Tockus alboterminatus*	1
White-eared Barbet *Buccanodon leucotis*	1

[1] see text

Species	Adaptability
Yellow-rumped Tinkerbird *Pogoniulus bilineatus*	2
Green Tinkerbird *P. simplex*	2
Pallid Honeyguide *Indicator meliphilus*	1
Scaly-throated Honeyguide *I. variegatus*	2
Little Spotted Woodpecker *Campethera cailliautii*	1
African Broadbill *Smithornis capensis*	3
Square-tailed Drongo *Dicrurus ludwigii*	3
Black-headed Oriole *Oriolus larvatus*	2
Pale-breasted Illadopsis *Trichastoma rufipennis*	3
Black Cuckoo Shrike *Campephaga flava*	1
Little Greenbul *Andropadus virens*	2
Yellow-bellied Greenbul *Chlorocichla flaviventris*	1
Nicator *Nicator chloris*	2
Tiny Greenbul *Phyllastrephus debilis*	3
Fischer's Greenbul *P. fischeri*	3
Yellow-streaked Greenbul *P. flavostriatus*	3
Eastern Bearded Scrub Robin *Cercotrichas quadrivirgata*	1
Red-capped Robin Chat *Cossypha natalensis*	1
Red-tailed Ant Thrush *Neocossyphus rufus*	2
East Coast Akalat *Sheppardia gunningi*	3
Black-headed Apalis *Apalis melanocephala*	2
Grey-backed Camaroptera *Camaroptera brachyura*	2
Kretschmer's Longbill *Macrosphenus kretschmeri*	2
Forest Batis *Batis mixta*	3
Little Yellow Flycatcher *Erythrocercus holochlorus*	3
Paradise Flycatcher *Terpsiphone viridis*	1
Crested Flycatcher *Trochocercus cyanomelas*	3
Black-backed Puffback *Dryoscopus cubla*	1
Tropical Boubou *Laniarius ferrugineus*	1
Four-coloured Bush shrike *Malaconotus quadricolor*	1
Chestnut-fronted Helmet Shrike *Prionops scopifrons*	2
Black-breasted Glossy Starling *Lamprotornis corruscus*	2
Collared Sunbird *Anthreptes collaris*	1
Uluguru Violet-backed Sunbird *A. neglectus*	3
Olive Sunbird *Nectarinia olivacea*	1
Yellow White-eye *Zosterops senegalensis*	1
Dark-backed Weaver *Ploceus bicolor*	3
Peters' Twinspot *Hypargos niveoguttatus*	1
Green-backed Twinspot *Mandingoa nitidula*	2

Non-forest birds

Other birds recorded in the reserve included Palm-nut Vulture *Gypohierax angolensis*, Bateleur *Terathopius ecaudatus*, Emerald-spotted Wood Dove *Turtur chalcospilos*, White-browed Coucal *Centropus superciliosus*, Little Swift *Apus affinis*, Palm Swift

Cypsiurus parvus, Speckled Mousebird *Colius striatus*, Brown-hooded Kingfisher *Halcyon albiventris*, Striped Kingfisher *H. chelicuti*, Woodland Kingfisher *H. senegalensis*, Böhm's Bee-eater *Merops boehmi*, Striped Swallow *Hirundo abyssinica*, African Golden Oriole *Oriolus auratus*, Zanzibar Sombre Greenbul *Andropadus importunus*, Northern Brownbul *Phyllastrephus strepitans*, Common Bulbul *Pycnonotus barbatus*, White-browed Scrub Robin *Cercotrichas leucophrys*, Moustached Warbler *Sphenoeacus mentalis*, Grey-headed Bush Shrike *Malaconotus blanchoti*, Waxbill *Estrilda astrild*, Lesser Seed-craker *Pyrenestes minor*, and Bronze Mannikin *Lonchura cucullata*.

Threatened species

Records of birds of global concern as defined in the ICBP/IUCN *Red Data Book* (Collar & Stuart 1985) included the rare East Coast Akalat; two near-threatened species, the Southern Banded Snake-eagle and the Uluguru Violet-backed Sunbird, and six "candidate" species: Green Tinkerbird, Tiny Greenbul, Kretschmer's Longbill, Little Yellow Flycatcher, Chestnut-fronted Helmet Shrike and Lesser Seed-cracker. All, save the last, are forest species in categories 2 and 3.

Table 2. *Mist-net samples*

Species	Number of captures
Brown-hooded Kingfisher	1
Pygmy Kingfisher	3
Green Tinkerbird	1
African Broadbill	2
Square-tailed Drongo	3
Pale-breasted Illadopsis	4
Little Greenbul	2
Nicator	1
Tiny Greenbul	6
Eastern Bearded Scrub Robin	2
Red-capped Robin Chat	17
Red-tailed Ant Thrush	1
East Coast Akalat	9
Grey-backed Camaroptera	4
Paradise Flycatcher	2
Crested Flycatcher	2
Uluguru Violet-backed Sunbird	1
Olive Sunbird	2
Dark-backed Weaver	1
Peters' Twinspot	2
Total	66

Mist-net samples

A total of 66 birds of 20 species was ringed (Table 2). Of these, the Red-capped Robin Chat was the most frequently caught, followed by the East Coast Akalat and the Tiny Greenbul. Given the global rarity of the akalat, the number of birds caught during this short study seems high. Compared with results from other recently-studied coastal forests in Tanzania, its relative abundance at Kazimzumbwe is much lower than at Rondo, where a total of 135 birds has been ringed, but slightly higher than at Litipo (see Faldborg *et al.* 1991, Holsten *et al.* 1991).

The overall capture rate was extremely low (3.6 birds/1000 net metre hours) compared to recent ringing studies elsewhere in coastal Tanzania (e.g. Faldborg *et al.* 1991, Holsten *et al.* 1991). This could be related to vegetation structure in the sampling site. In the lower strata, where mist-netting was carried out, the vegetation was relatively very open, with fewer birds than in the sub-canopy and canopy layers. In the upper layers, birds such as the Square-tailed Drongo, Uluguru Violet-backed Sunbird, Olive Sunbird, and the Dark-backed Weaver were fairly abundant (pers. obs.).

Other notable observations

Pale-breasted Illadopsis *Trichastoma rufipennis puguensis*

This subspecies is believed to be endemic to the Pugu Hills (Mackworth-Praed & Grant 1957). Four were captured in Kazimzumbe.

Pearl-spotted Owlet *Glaucidium perlatum*

Two were observed on five occassions feeding at dusk from a perch near the camp. Although usually described as hunting by dropping on to its prey (Roberts 1978), these individuals were hawking insects from their perch, catching prey in mid-air like flycatchers.

Discussion

The number of forest birds (58 species) recorded is unexpectedly high considering the short duration of the study, and the fact that it was conducted in the dry season. The species richness is already above that recorded for many other Tanzanian coastal forests, including Kiono, Pande, Kisiju, Kiwengoma, Rondo, Litipo, Msubugwe and Nyagamara (Bagger *et al.* 1989, Burgess *et al.* 1991, Faldborg *et al.* 1991, Holsten *et al.* 1991). Among the forest birds recorded, 34 species are dependent on forest for their survival. These findings indicate the considerable ornithological importance of Kazimzumbwe forest.

Sixty-five species of forest birds are known from the neighbouring Pugu forest (N.E. Baker, pers. comm.), including the vulnerable Sokoke Pipit *Anthus sokokensis*, the rare Spotted Ground Thrush *Turdus fischeri* and the East Coast Akalat, and the near-threatened Southern Banded Snake-eagle and Uluguru Violet-backed Sunbird (Turner 1977, Howell 1981, Stuart 1981, Collar & Stuart 1985, 1988); there is also an endemic subpecies—*Trichastoma rufipennis puguensis*. With the exception of the pipit and the ground thrush, all the other species were recorded during this study. It is likely that visits to Kazimzumbwe in other months would result in the recording of other forest bird species, including intra-African passage migrants such as the African Pitta *Pitta*

angolensis and the Spotted Ground Thrush, which are usually recorded at Pugu in April–May (Baker & Baker 1992). Furthermore, it would not be surprising to find the Sokoke Pipit in Kazimzumbwe forest; as well as occurring at Pugu, this species has recently been recorded in Vikindu Forest Reserve (Mlingwa 1991). It is possible therefore that the conservation importance of Kazimzumbwe may be on a par with that of Pugu, which is among the key forests for threatened birds in Africa (see Collar & Stuart 1988).

Because of land pressure from human activities taking place in and adjacent to Pugu Forest Reserve, Howell (1981) and Collar & Stuart (1985, 1988) have proposed that the small area of remaining forest should be declared a nature reserve for effective preservation of its biological values. Despite these proposals, nothing has taken place; in fact, more land is being cleared around kaolin mines to provide space for mining extension and for workers' farm gardens (pers. obs.). In addition, extensive illegal felling of valuable trees (e.g. *Milicia excelsa*, "mvule") has occurred since 1986 (K.M.Howell, pers. comm.) and peaked in 1990, resulting in destruction of two important bird ringing sites. Kazimzumbwe, with its comparatively less disturbed forest vegetation, could form a "security area" if the situation in Pugu Forest Reserve continues to deteriorate. However, as suggested for Pugu forest (Hawthorne 1985), it will only be possible to protect Kazimzumbwe Forest from further clearance by initiating tree-planting schemes on the periphery to provide fuel and construction material for local human populations. Such schemes need to be established along agroforestry lines. With proper planning and implementation of agroforestry, the same land under cultivation may offer both increased agricultural productivity and continued sustainable exploitation of tree products to meet the increasing demands of the local populations. In addition, the area under agroforestry could serve as a buffer zone for these forest islands.

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